Editorial overview: Cyberpsychology: reviews of research on the intersection between computer technology use and human behavior

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Introduction

Computer technology has proliferated and advanced, from large mainframes in the 1970s, to the modern smartphone first released in 2007, and beyond. In this era, empirical research has also proliferated on how people use computer and internet technology, at times adaptively, but at other times maladaptively. Studies have explored benefits of computer technology use, such as boosting social capital [1], aiding educational learning [2], and facilitating mental healthcare delivery [3]. Research has also examined the darker side of such technology use, including adverse effects from overuse [4], work-related and school-related use interference [5], and concerns about electronic data breaches [6]. These topics fall within the area of study known as 'cyberpsychology.'

Cyberpsychology specifically is the study of how psychological processes intersect with computer technology use [7,8]. Some research in cyberpsychology examines how computer technology use *influences and drives* human behavior (whether in a positive *or* negative way), such as work mentioned above on how internet data breaches may cause anxiety [6], or how social networking site use can promote social capital [1]. Other research in cyberpsychology explores how computer technology is *developed or used* in order to solve human-related and specifically psychology-related challenges, such as using telehealth interventions to remotely treat mental health patients [3], or building social robots to improve children's social skills [9]. We should also note that cyberpsychology is related to (but distinct from) the field of human-computer interaction, involving the study of computer and internet website design, typically focused on improving the user interface [10].

In the present issue of *Current Opinion in Psychology*, we offer reviews from both of these major areas of cyberpsychology research that we described above. Thus, we include reviews on how computer technology influences human behavior. And we include reviews about the use of computer technology in solving psychology-related challenges.

How computer technology influences human behavior

Several papers in this special issue describe possible positive consequences of computer technology for people. In particular, several authors review using the internet to develop and maintain romantic relationships [11], and utilize online communities to harvest and promote knowledge and support

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[12]. Such research is important, given prior unproven myths regarding online socialization replacing offline social contact [discussed in Ref. 13]. Other authors, however, review research on adverse consequences of computer technology use, including excessive internet and gaming use [14–16], adverse effects of interruptive notifications [17], cyberbullying [18], fake news and filter bubbles [19], and challenges to and concern with our online privacy and security [20,21]. These reviews should remind us that new technology is not inherently good or bad, but it is how we use such technology that determines whether it will have positive or adverse consequences.

We also include reviews in this category that focus on online self-disclosure [22], impression management [23], and social comparison [24]. Furthermore, authors cover individual personality and sociodemographic differences in how people use the internet and social networking [25], attitudes about adopting new technology use [26], and the influence of online business marketing on consumer behavior [27]. These reviews shed further light on specific ways in which computer technology may influence psychological and psychosocial processes.

How computer technology has solved psychology-related challenges

In the year 2020, the entire globe experienced the COVID-19 viral pandemic [28], which had profound effects for people traditionally accustomed to working and attending school in-person and/or offline. The home quarantine and social distancing needed to combat COVID-19 [29] suspended in-person school, and suspended or restricted in-person business in most parts of the world [30]. Consequently, people in nearly all countries were required to adapt, using internet technology to attend school and work.

This section's review of computer technology that has been successfully used for facilitating mental health and other practical human interventions is therefore timely and important, given the shift away from in-person interventions during the pandemic. Authors in this special issue review research on virtual reality [31,32], and mobile app interventions to facilitate mental healthcare [33]. Other authors discuss artificial intelligence and machine learning [34,35] and digital phenotyping [36] in order to improve observation of human behavior to better understand emotions and behavior [37]. Also covered is social robotics to implement human socialization interventions [38], and technology for improving learning outcomes among students [39].

Conclusion

The field of cyberpsychology has been in a rapid expansion over the past years, since both potential benefits and challenges across different disciplines have attracted attention. Moreover, because the role of technology in people's lives is increasing, the field of cyberpsychology intersects with more traditional domains of psychology, such as personality, clinical, as well as developmental psychology. We believe that not only psychology professionals, but also those in other fields, may find topics in this special issue useful.

The current issue covers a variety of topics that are currently not only attracting attention among academics, but are also frequently discussed in media outlets for a wider audience. It is not only researchers who want to know, for example, whether violent videogames may promote aggressive behavior, or who may be more susceptible to fake news, or how to use digital technologies, such as virtual reality and social robotics, to promote well-

being. We believe that with the ever-increasing penetration of technology in everyday life, several answers are provided in the work published in this special issue. The content is not only useful for researchers within specific subdisciplines of cyberpsychology; one may find these articles also as useful introductions into different research areas connected by the interest towards technology's relation to human behavior and psychology.

The authors who have contributed to the current special issue have a wide range of expertise and experience. Papers are authored by experienced academic researchers as well as experts who work outside academia, providing a synthesis of both theoretical and practical merit. We extend appreciation to all authors for their contribution to this special issue!

In conclusion, this special issue is a valuable read, covering up-to-date topics and discussions by experts of several research (sub)disciplines in the domain of cyberpsychology. The work published represent concise overviews of most recent developments, and many papers also provide insights into future perspectives, possibly inspiring a large body of high-quality research. We believe that the reader of this special issue will not be disappointed by the content.

Conflict of interest statement
Nothing declared.

References

1. Cheng C, Wang HY, Sigerson L, Chau CL: **Do the socially rich get richer? A nuanced perspective on social network site use and online social capital accrual**. *Psychol Bull* 2019, **145**:734-764.

2. Crompton H, Burke D: **The use of mobile learning in higher education: a systematic review**. *Comput Educ* 2018, **123**:53-64.

3. Fletcher TL, Hogan JB, Keegan F, Davis ML, Wassef M, Day S, Lindsay JA: **Recent advances in delivering mental health treatment via video to home**. *Curr Psychiatry Rep* 2018, **20**:56.

4. Elhai JD, Dvorak RD, Levine JC, Hall BJ: **Problematic smartphone use: a conceptual overview and systematic review of relations with anxiety and depression psychopathology**. *J Affect Disord* 2017, **207**:251-259.

5. Van Laethem M, van Vianen AEM, Derks D: **Daily fluctuations in smartphone use, psychological detachment, and work engagement: the role of workplace telepressure**. *Front Psychol* 2018, **9**:1808.

6. Elhai JD, Levine JC, Hall BJ: **Anxiety about electronic data hacking: predictors and relations with digital privacy protection**. *Internet Res* 2017, **27**:631-649.

7. Attrill-Smith A, Fullwood C, Keep M, Kuss DJ: *The Oxford Handbook of Cyberpsychology*. Oxford, England: Oxford University Press; 2019.

8. Norman KL: *Cyberpsychology: An Introduction to Human-Computer Interaction*. Cambridge, England: Cambridge University Press; 2017.

9. Ismail LI, Verhoeven T, Dambre J, Wyffels F: **Leveraging robotics research for children with autism: a review**. *Int J Soc Robot* 2018, **11**:389-410.

10. Shneiderman B, Plaisant C, Cohen M, Jacobs S, Elmqvist N, Diakopoulos N: *Designing the User Interface: Strategies for Effective Human-computer Interaction*. Essex, England: Pearson; 2016.

11. van Ouytsel J, Punyanunt-Carter NM, Walgrave M, Ponnet K: **Sexting within young adults' dating and romantic relationships**. *Curr Opin Psychol* 2020, **36**:55-59.

12. Tausczik Y, Huang X: **Knowledge generation and sharing in online communities: current trends and future directions**. *Curr Opin Psychol* 2020, **36**:60-64.

13. Hall JA, Kearney MW, Xing C: **Two tests of social displacement through social media use**. *Inf Commun Soc* 2018, **22**:1396-1413.

14. Brand M, Rumpf HJ, King DL, Potenza MN, Wegmann E: **Clarifying terminologies in research on gaming disorder and other addictive behaviors: distinctions between core symptoms and underlying psychological processes**. *Curr Opin Psychol* 2020, **36**:49-54.

15. Kircaburun K, Pontes H, Stavropoulos V, Griffiths M: **A brief psychological overview of disordered gaming**. *Curr Opin Psychol* 2020, **36**:38-43.

16. Hussain Z, Starcevic V: **Problematic social networking site use: a brief review of recent research methods and the way forward**. *Curr Opin Psychol* 2020, **36**:89-95.

17. Kushlev K, Leitao M: **The effects of smartphones on well-being: theoretical integration and research agenda**. *Curr Opin Psychol* 2020, **36**:77-82.

18. Machackova H: **Bystander reactions to cyberbullying and cyberaggression: individual, contextual, and social factors**. *Curr Opin Psychol* 2020, **36**:130-134.

19. Sindermann C, Cooper AJ, Montag C: **A short review on susceptibility to falling for fake political news**. *Curr Opin Psychol* 2020, **36**:44-48.

20. Lustgarten SD, Garrison YL, Sinnard MT, Flynn AWP: **Digital privacy in mental healthcare: current issues and recommendations for technology use**. *Curr Opin Psychol* 2020, **36**:25-31.

21. Chen J: **Risk communication in cyberspace: a brief review of the information-processing and mental models approaches**. *Curr Opin Psychol* 2020, **36**:135-140.

22. Bazarova N, Masur P: **Towards an integration of individualistic, networked, and institutional approaches to online disclosure and privacy in a networked ecology**. *Curr Opin Psychol* 2020, **36**:118-123.

23. Scott GG, Fullwood C: **Does recent research evidence support the hyperpersonal model of online impression management?** *Curr Opin Psychol* 2020, **36**:106-111.

24. Verduyn P, Gugushvili N, Massar K, Täht K, Kross E: **Social comparison on social networking sites**. *Curr Opin Psychol* 2020, **36**:32-37.

25. Baloglu M, Şahin R, Arpaci I: **A review of recent research in problematic internet use: gender and cultural differences**. *Curr Opin Psychol* 2020, **36**:124-129.

26. Dwivedi Y, Rana NP, Tamilmani K, Ramen R: **A meta-analysis based modified unified theory of acceptance and use of technology (meta-UTAUT): a review of emerging literature**. *Curr Opin Psychol* 2020, **36**:13-18.

27. Rasool A, Shah FA, Islam JU: **Customer engagement in the digital age: a review and research agenda**. *Curr Opin Psychol* 2020, **36**:96-100.

28. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, Ren R, Leung KSM, Lau EHY, Wong JY *et al.*: **Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia**. *N Eng J Med* 2020, **382**:1199-1207.

29. Xiang Y-T, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, Ng CH: **Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed**. *Lancet Psychiatry* 2020, **7**:228-229.

30. McKibbin W, Fernando R: *Economics in the Time of COVID-19*. Chicago, Illinois: CEPR Press; 2020.

31. Vasser M, Aru J: **Guidelines for immersive virtual reality in psychological research**. *Curr Opin Psychol* 2020, **36**:71-76.

32. Anderson PL, Molloy A: **Maximizing the impact of virtual reality exposure therapy for anxiety disorders**. *Curr Opin Psychol* 2020, **36**:153-157.

33. Huckvale K, Nicholas J, Torous J, Larsen M: **Smartphone apps for the treatment of mental health conditions: status and considerations**. *Curr Opin Psychol* 2020, **36**:65-70.

34. D'Alfonso S: **AI in mental health**. *Curr Opin Psychol* 2020, **36**:112-117.

35. Elhai JD, Montag C: **The compatibility of theoretical frameworks with machine learning analyses in psychological research**. *Curr Opin Psychol* 2020, **36**:83-88.

36. Montag C, Sindermann C, Baumeister H: **Digital phenotyping in psychological and medical sciences: a reflection about necessary prerequisites to reduce harm and increase benefits**. *Curr Opin Psychol* 2020, **36**:19-24.

37. Baumeister H, Montag C: *Digital Phenotyping and Mobile Sensing*. Cham, Switzerland: Springer; 2020.

38. Sheridan TB: **A review of recent research in social robotics**. *Curr Opin Psychol* 2020, **36**:7-12.

39. Crompton H, Bernacki M, Greene JA: **Psychological foundations of emerging technologies for teaching and learning in higher education**. *Curr Opin Psychol* 2020, **36**:100-105.